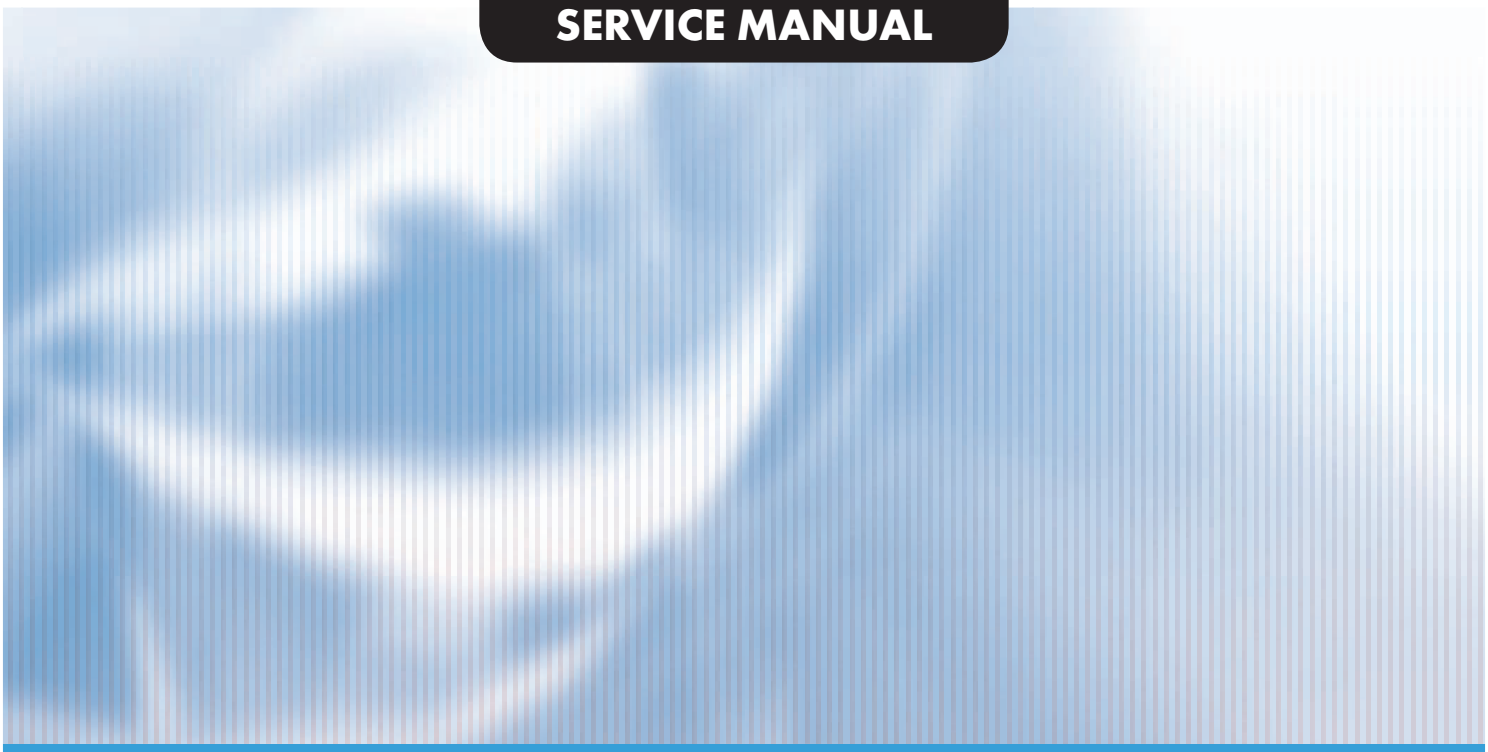
SERVICE MANUAL



CONDENSING UNIT

ASE-18AH, ASE-24AH, ASE-36AH, ASE-48AH, ASE-60AH

sinclair

AIR CONDITIONING

Outdoor Units - appearance

18,000Btu/h

30,000~36,000Btu/h

24,000Btu/h

48,000Btu/h-60,000Btu/h

Model Names of Outdoor Units

Universal Outdoor unit Model	Compressor type	Compressor Brand
Heat Pump		
ASE-18AH	Rotary	GMCC
ASE-24AH	Rotary	GMCC
ASE-36AH	SCROLL	SANYO
ASE-48AH	SCROLL	SANYO
ASE-60AH	SCROLL	SANYO

Features

High quality coils:

The coil is constructed of advanced inner grooved copper tube and aluminum fins.

Anti-rust, 500 hours salt spray test.

Low operation sound level: Well-known stable and quiet running fan motor.

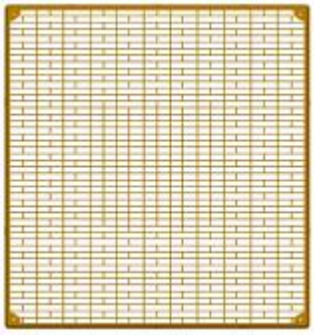
Well-known compressor.

Compact design: Smaller dimension and larger stuffing capacity.

Universal outdoor unit design.

Optional air outlet grille: plastic type and wire type.

Wire type



Plastic type

Plastic type

Optional low temperature cooling module.

R410A environment friendly refrigerant.

Outdoor Units

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Model			ASE-18AH	ASE-24AH
Code			220037802190	220075301210
Power supply		V-ph-Hz	220~240-1-50	220~240-1-50
Max. input consumption		W	2950	3450
Max. input current		A	15	18
Compressor	Model		PA225X2CS-4KU1	PA290X3CS-4MU1
	Type		Rotary	Rotary
	Brand		GMCC	GMCC
	Capacity	Btu/h	18493/18698	24498
	Input	W	1855/1940	2430
	Rated current(RLA)	A	8.7/8.7	11.4
	Locked rotor Amp(LRA)	A	36.8	61
	Thermal protector		Internal	Internal
	Capacitor	μF	50μF/440V-450V	50μF/440V-450V
	Refrigerant oil	ml	ESTER OIL VG74 750	ESTER OIL VG74/950
Outdoor fan motor	Model		YDK48-6H(A)	YDK100-6D
	Qty		1	1
	Input	W	110	168.7
	Capacitor	μF	3μF/450V	5μF/450V
	Speed	r/min	890	900
Outdoor coil	Number of rows		2	2
	Tube pitch(a)× row pitch(b)	mm	21x13.37	21x13.37
	Fin spacing	mm	1.4	1.4
	Fin type		Hydrophilic aluminium	Hydrophilic aluminium
	Tube outside dia.and type	mm	φ7, Inner grooved copper tube	φ7, Inner grooved copper tube
	Coil length × height × width	mm	658x546x26.74	785x651x26.74
	Number of circuits		4	4
Outdoor air flow		m^3/h	2439	3200
Outdoor noise level (sound pressure)		dB(A)	54	55
Outdoor unit	Dimension(W×H×D)	mm	760x590x285	845×695×324
	Packing (W×H×D)	mm	887×645×355	965×755×395
	Net/Gross weight	kg	39/42	53/57
Refrigerant	Type		R410a	R410a
	Charged volume	g	1400	1900
Throttle type			Capillary	Capillary
Design pressure		MPa	4.2/1.5	4.2/1.5
Refrigerant piping	Liquid side/ Gas side	mm	φ6.4/φ12.7	φ9.5/φ15.9
	Max. pipe length	m	25	25
	Max. difference in level	m	15	15
Ambient temp.		℃	cooling:18~43; heating:-7~24	cooling: 18~43; heating:-7~24

Notes: 1. Nominal cooling capacities are based on the following conditions:
Indoor temp: 27°CDB, 19°CWB; Outdoor temp: 35°CDB;
2. Nominal heating capacities are based on the following conditions:
Indoor temp: 20°CDB; Outdoor temp: 7°CDB, 6°CWB;
3. Actual noise level may differ, depending on the room structure, etc, since these noise values are from an anechoic room.

Model			ASE-36AH
Code			220075500682
Power supply		V-ph-Hz	380~415-3-50
Max. input consumption		W	4950
Max. input current		A	10
Compressor	Model		C-SBN303H8D
	Type		SCROLL
	Brand		SANYO
	Capacity	Btu/h	33438
	Input	W	3650
	Rated current(RLA)	A	6.58
	Locked rotor Amp(LRA)	A	48
	Thermal protector		Internal
	Capacitor	μF	--
	Refrigerant oil	ml	FV68S/1700
Outdoor fan motor	Model		YDK190-6D
	Qty		1
	Input	W	290
	Capacitor	μF	10μF/450V
	Speed	r/min	840
Outdoor coil	Number of rows		2
	Tube pitch(a)× row pitch(b)	mm	21x13.37
	Fin spacing	mm	1.4
	Fin type		Hydrophilic aluminium
	Tube outside dia.and type	mm	φ7, Inner grooved copper tube
	Coil length × height × width	mm	890x903x26.74
	Number of circuits		7
Outdoor air flow		m^3/h	5000
Outdoor noise level (sound pressure)		dB(A)	57
Outdoor unit	Dimension(W×H×D)	mm	990×966×354
	Packing (W×H×D)	mm	1120×1100×435
	Net/Gross weight	kg	92/96
Refrigerant	Type		R410a
	Charged volume	g	2900
Throttle type			capillary
Design pressure		MPa	4.2/1.5
Refrigerant piping	Liquid side/ Gas side	mm	φ12.7/φ19
	Max. pipe length	m	30
	Max. difference in level	m	20
Ambient temp.		℃	cooling: 18~43; heating:-7~24

Notes: 1. Nominal cooling capacities are based on the following conditions:
Indoor temp: 27°CDB, 19°CWB; Outdoor temp: 35°CDB;

2. Nominal heating capacities are based on the following conditions:
Indoor temp: 20°CDB; Outdoor temp: 7°CDB, 6°CWB;

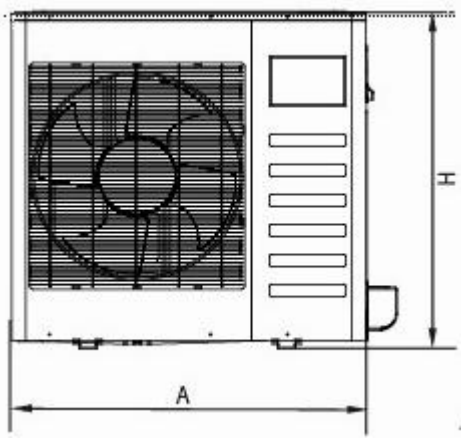
3. Actual noise level may differ, depending on the room structure, etc, since these noise values are from an anechoic room.

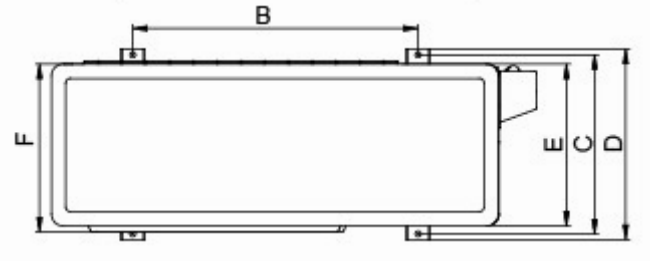
Model			ASE-48AH	**ASE-60AH**
Code			220075701250	220075800650
Power supply		V-ph-Hz	380~415-3-50	380~415-3-50
Max. input consumption		W	6300	7500
Max. input current		A	10.5	12.6
Compressor	Model		C-SBN373H8D	C-SBN453H8D
	Type		Scroll	Scroll
	Brand		Sanyo	Sanyo
	Capacity	Btu/h	48109	55956.8
	Input	W	4750	5750
	Rated current(RLA)	A	8.22	9.77
	Locked rotor Amp(LRA)	A	66	67
	Thermal protector		Internal	Internal
	Capacitor	μF	--	---
	Refrigerant oil	ml	FV68S,1700	FV68S, 1700
Outdoor fan motor	Model		YDK65-6-1+YDK65-6F-1	YDK65-6+YDK65-6F
	Qty		2	2
	Input	W	171×2	148+140
	Capacitor	μF	(4μF/450V)×2	(3.5μF/450V)×2
	Speed	r/min	825	800
Outdoor coil	Number of rows		2	2
	Tube pitch(a)× row pitch(b)	mm	21×13.37	22×19.05
	Fin spacing	mm	1.4	1.6
	Fin type		Hydrophilic aluminium	Hydrophilic aluminium
	Tube outside dia. and type	mm	φ7 Inner grooved copper tube	φ7.94 Inner grooved copper tube
	Coil length × height × width	mm	840×1113×26.74	837×1100×38.1
	Number of circuits		4	8
Outdoor air flow		m^3/h	6800	6850
Outdoor noise level (sound pressure)		dB(A)	59	59
Outdoor unit	Dimension(W×H×D)	mm	900×1167×340	900×1167×340
	Packing (W×H×D)	mm	1032×1307×443	1032×1307×443
	Net/Gross weight	kg	102/106	106/111
Refrigerant	Type		R410a	R410A
	Charged volume	g	3250	3200
Throttle type			capillary	capillary
Design pressure		MPa	4.2/1.5	4.2/1.5
Refrigerant piping	Liquid side/ Gas side	mm	φ12.7/φ19	φ12.7/φ19
	Max. pipe length	m	50	50
	Max. difference in level	m	25	25
Ambient temp.		℃	cooling: 18~43; heating:-7~24	cooling: 18~43; heating:-7~24

Notes: 1. Nominal cooling capacities are based on the following conditions:
Indoor temp: 27°CDB, 19°CWB; Outdoor temp: 35°CDB;
2. Nominal heating capacities are based on the following conditions:
Indoor temp: 20°CDB; Outdoor temp: 7°CDB, 6°CWB;
3. Actual noise level may differ, depending on the room structure, etc, since these noise values are from an anechoic room.

Model	Rated current
ASE-18AH	15A
ASE-24AH	18A
ASE-36AH	10A 3 phases
ASE-48AH	12.5A 3 phases
ASE-60AH	12.6A 3 phases

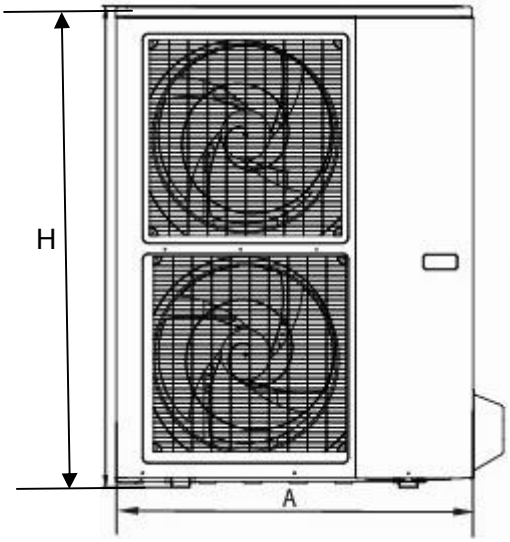
2. Dimensions

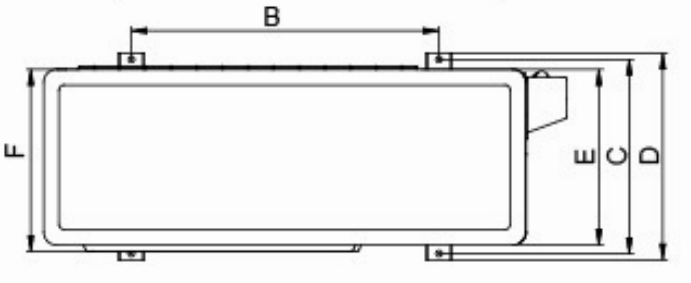




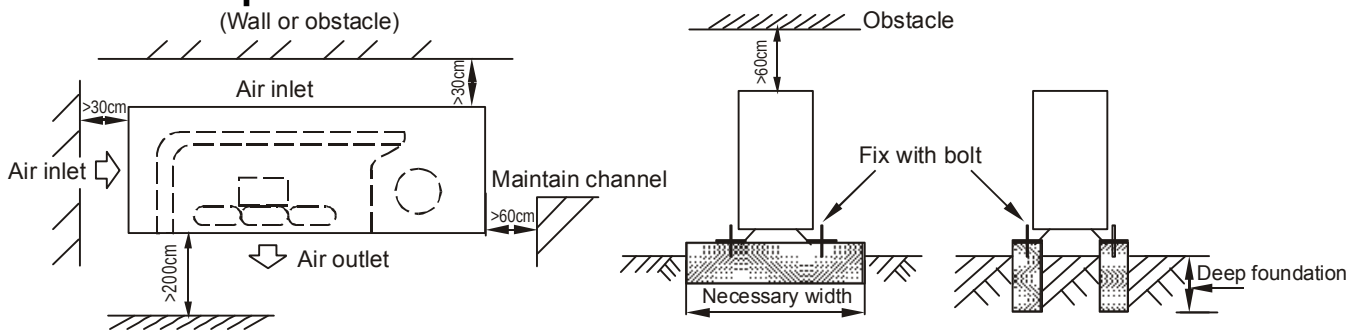
Model (mm)	A	B	C	D	E	F	H
ASE-18AH	760	530	290	315	270	285	590
ASE-24AH	842	560	335	360	312	324	695
ASE-36AH	990	624	366	396	340	354	966

Model(mm)	A	B	C	D	E	F	H
ASE-48AH	900	590	378	400	330	340	1167
ASE-60AH	900	590	378	400	330	340	1167

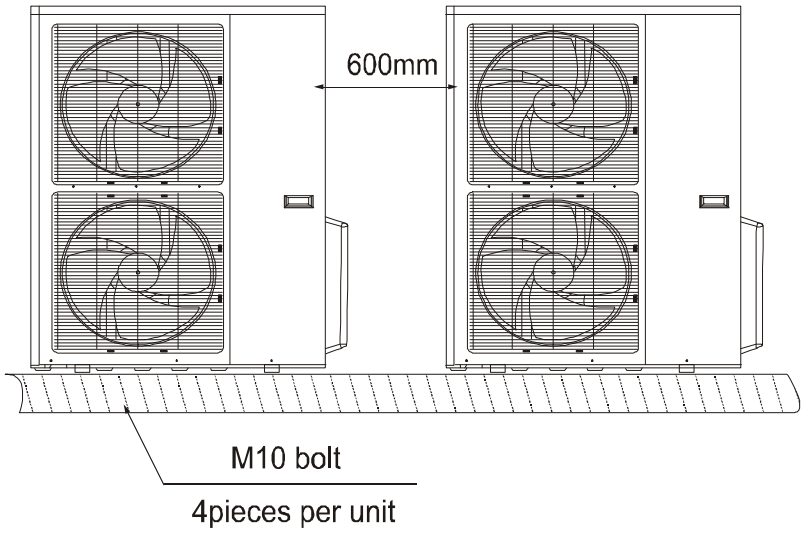




3. Service Space



600mm is necessary between 2 outdoor units



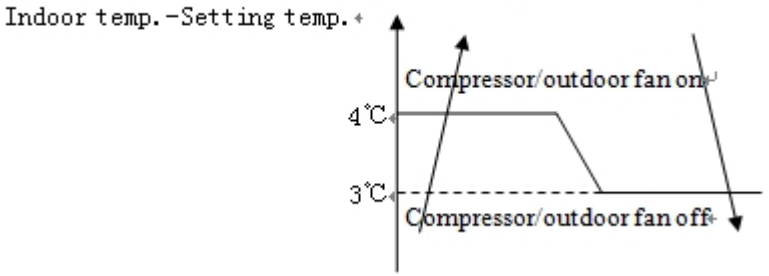
Logic of controlling compressor and fan of condensing units ASE-xxAH

1, For 18,24,36K units,

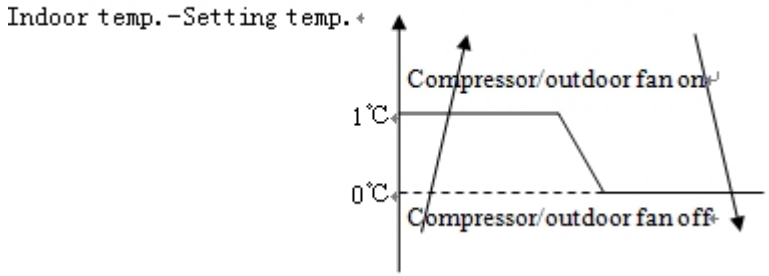
All the outdoor fan have a outdoor fan with fixed speed. Normally the outdoor fan runs with the compressor. The outdoor fan starts when the compressor starts, and stops when the compressor stops. And their running status are determined by the difference between indoor and setting temprature.

The control logic:

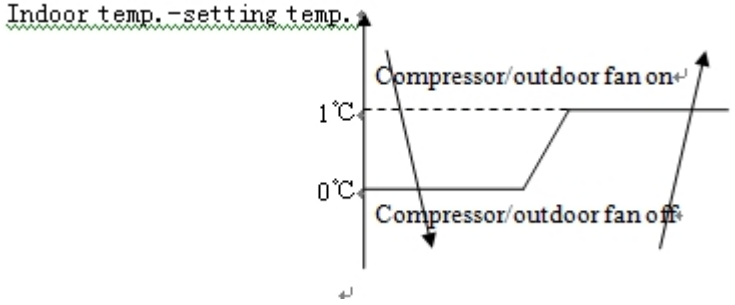
When in heating mode and the temperature compensation is 4℃,



When in heating mode and the temperature compensation is 1℃,



When in cooling mode,

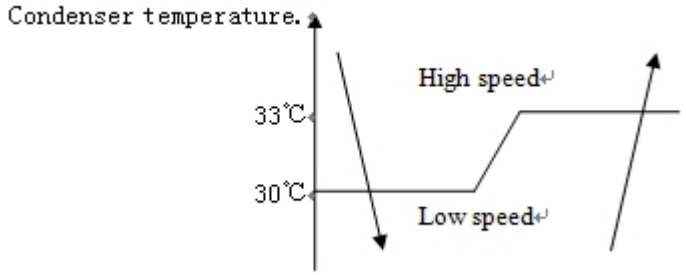


2, For 48K and 60K units,

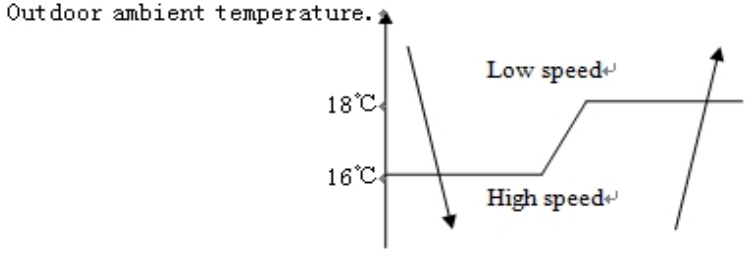
Some are with single fan and some are with twin fans,

For the units with single fan, the fan motors have two speeds; :

when in cooling mode,

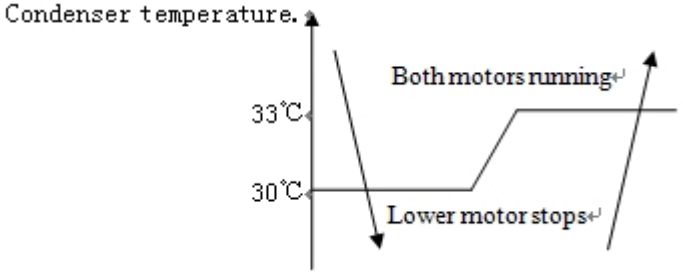


When in heating mode,

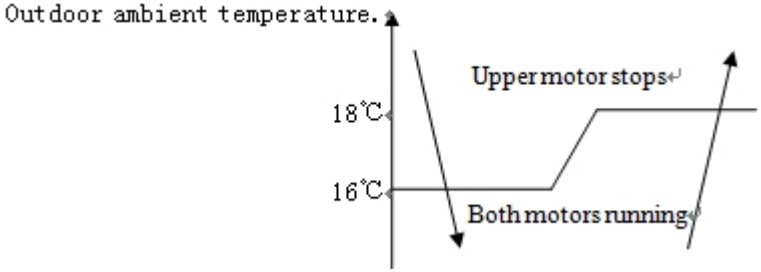


For the units with two outdoor fan motors, in some occasions, one motor will stop:

When in cooling mode,

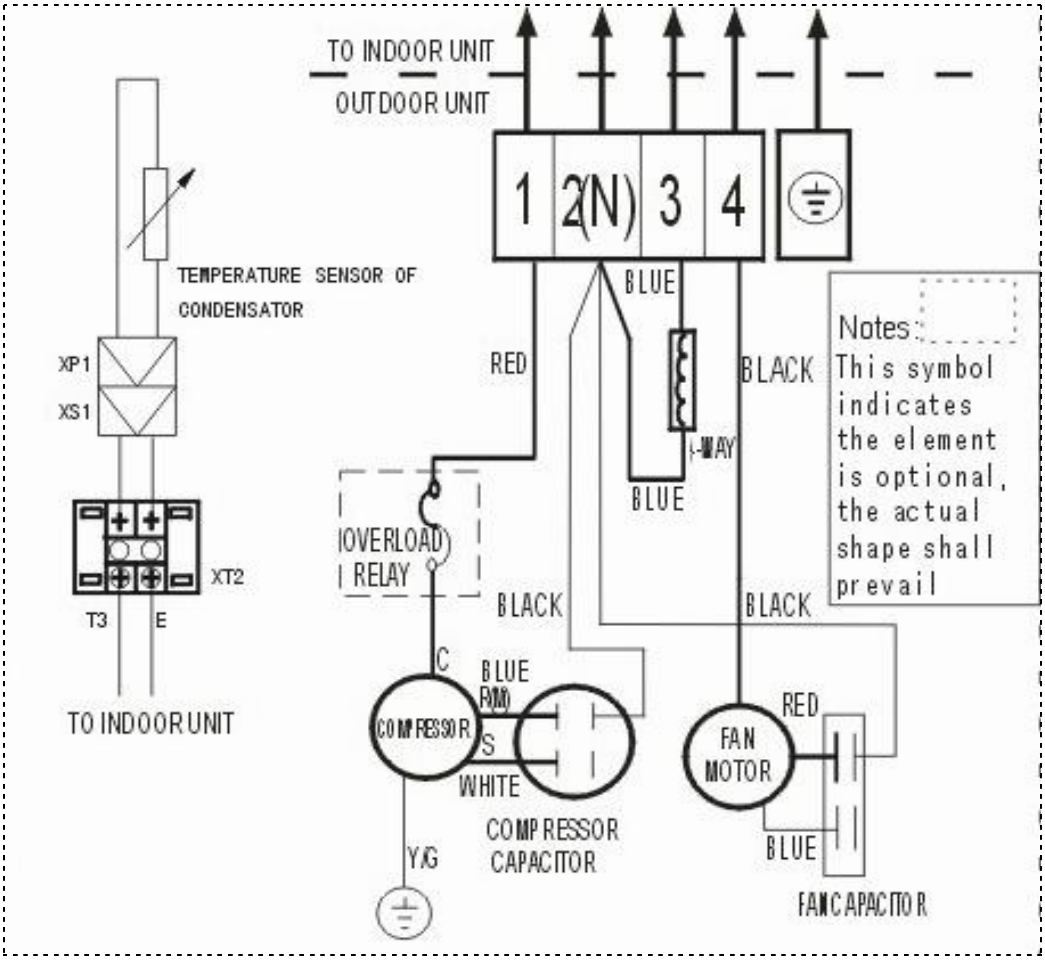


When in heating mode,

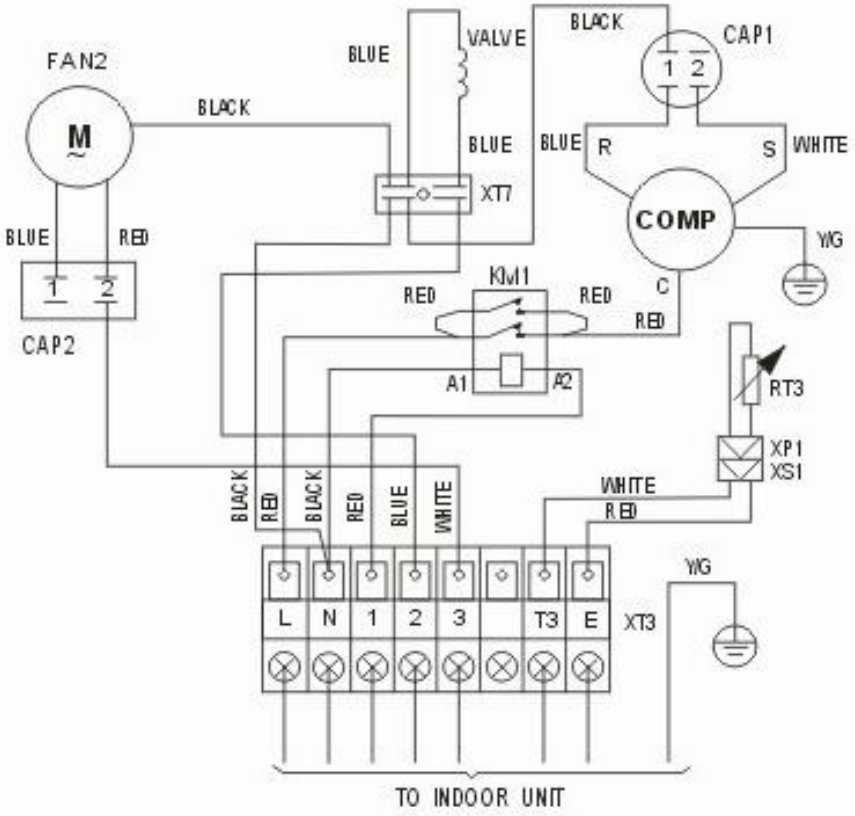


4. Wiring Diagrams

ASE-18AH



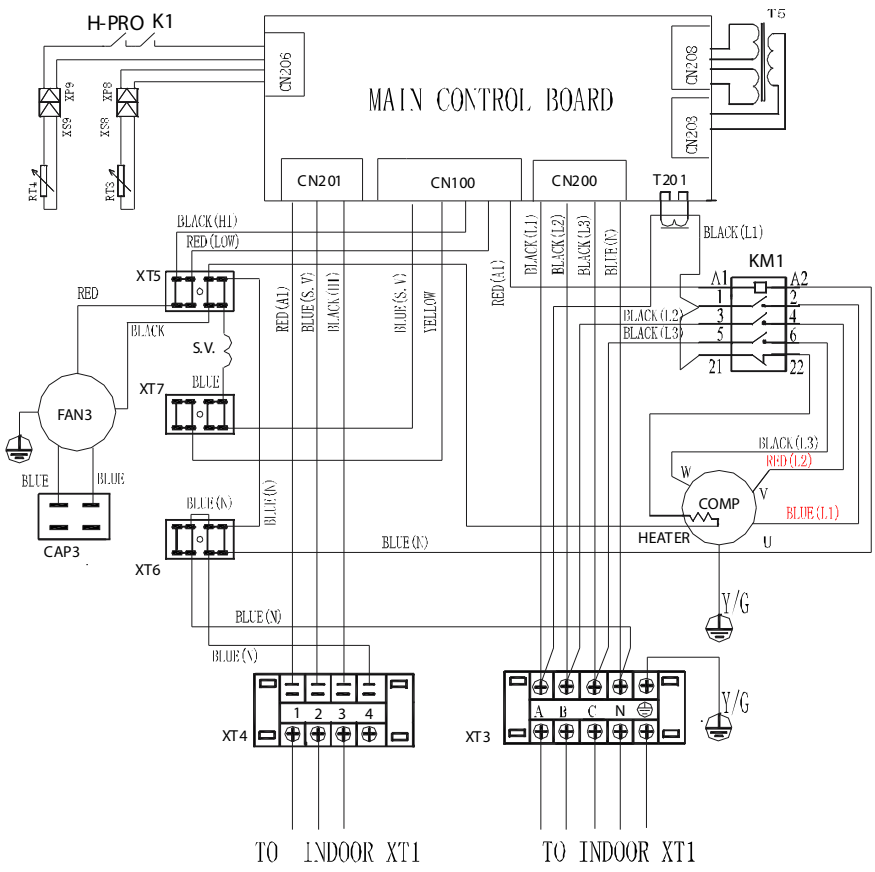
ASE-24AH



WIRING DIAGRAM
(OUTDOOR UNIT)

CODE	PART NAME
COMP	COMPRESSOR
CAP1	COMPRESSOR CAPACITOR
FAN2	OUTDOOR FAN
CAP2	OUTDOOR FAN CAPACITOR
XT3	8-WAY TERMINAL
XT7	MIDDLE TERMINAL
VALVE	REVERSING VALVE
XP1,XS1	CONNECTORS
RT3	PPE TEMPERATURE SENSOR
KM1	AC CONTACTOR

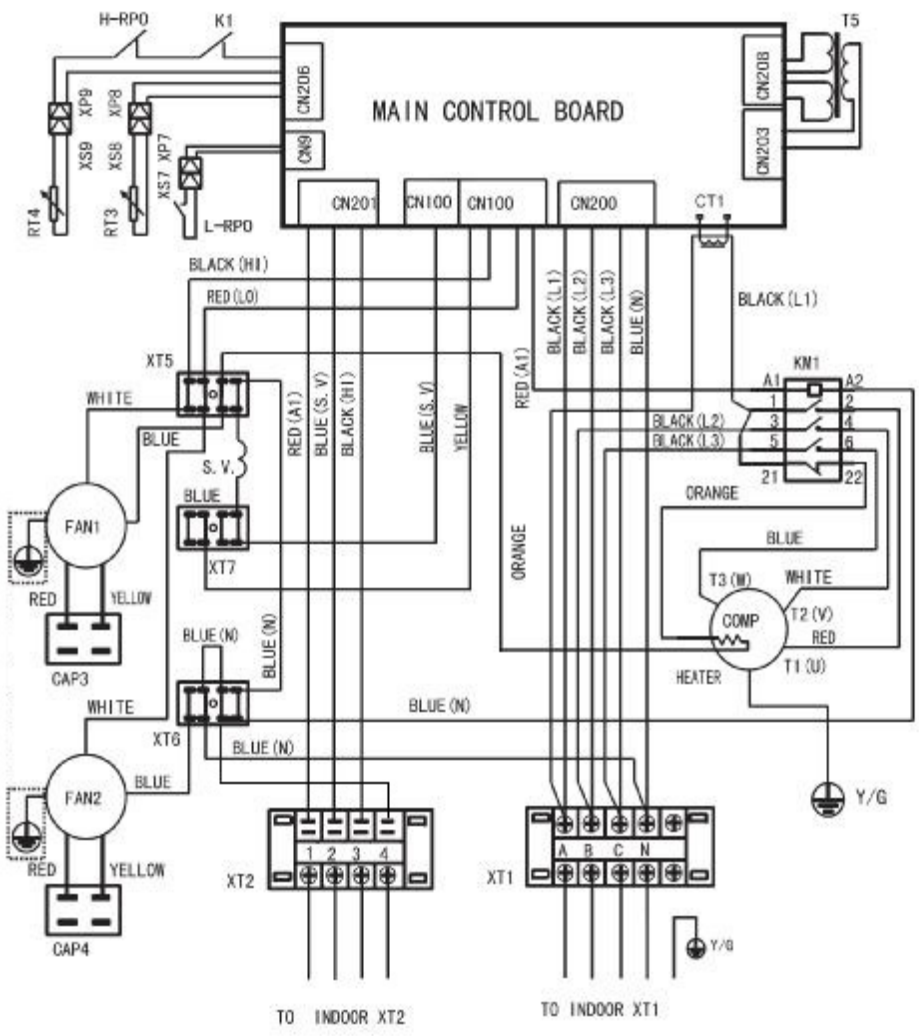
ASE-36AH



CODE	PART NAME
COMP	COMPRESSOR
FAN3	OUTDOOR FAN
CAP3	FAN CAP.
S.V.	4-WAY VALVE
KM1	AC CONTACTOR
HEAT	CRANK
XT4	4-WAY TERMINAL
XT5-7	CONNECTOR
H-PRO	HIGH PRESSURE SWITCH
T201	CURRENT DETECTOR
RT3	PIPE TEMP. SENSOR
XS8-9	CONNECTORS
XP8-9	CONNECTORS
CN100-208	P.C.BOARD SOCKETS
K1	TEMP. PROTECT SWITCH
RT4	ROOM TEMP. SENSOR
XT3	5-WAY TERMINAL
T5	TRANSFORMER

1, 2, 3 are just input signal to outdoor PCB
If 1 and N are 220V, the compressor will start.
If 2 and N are 220V, the four-way valve will start.
If 3 and N are 220V, the fan will start.

ASE-48AH A S E - 6 0 A H



WIRING DIAGRAM

(OUTDOOR UNIT)

CODE	PART NAME
COMP	COMPRESSOR
FAN1 FAN2	OUTDOOR FAN
CAP3 CAP4	FAN CAP.
S. V.	4-WAY VALVE
KM1	AC CONTACTOR
HEATER	CRANK
XT2	4-WAY TERMINAL
XT5-7	CONNECTOR
H/L-PRO	HIGH/LOW PRESSURE SWITCH
RT3	PIPE TEMP. SENSOR
XS7-9	CONNECTORS
XP7-9	CONNECTORS
CN100-208	P. C. BOARD SOCKETS
K1	TEMP. PROTECT SWITCH
RT4	ROOM TEMP. SENSOR
XT1	5-WAY TERMINAL
T5	TRANSFORMER
CT1	CURRENT DETECTOR

202075890205

1, 2, 3 are just input signal to outdoor PCB
If 1 and N are 220V, the compressor will start.
If 2 and N are 220V, the four-way valve will start.
If 3 and N are 220V, the fan will start.

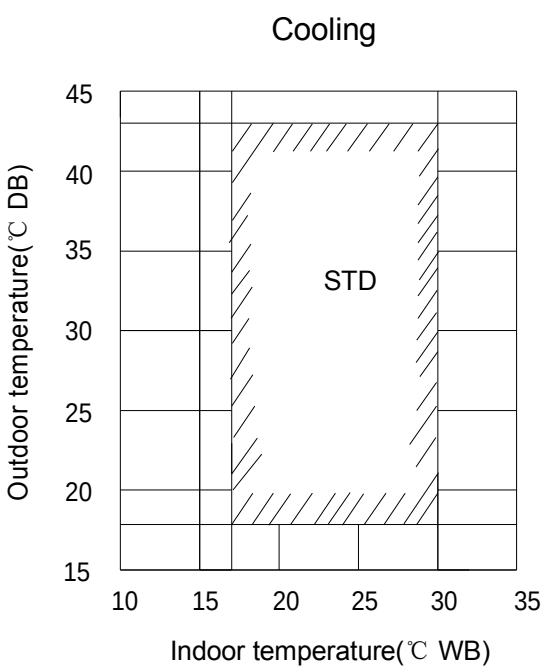
5. Electric Characteristics

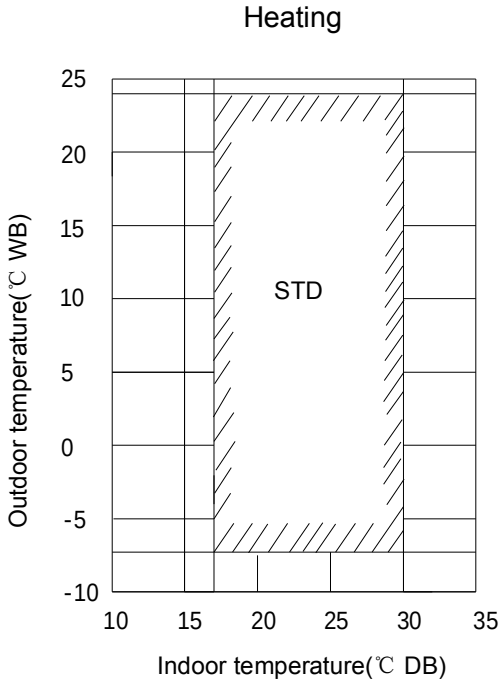
Model	Outdoor Unit			
	Hz	Voltage	Min.	Max.
ASE-18AH	50	220-240V	198V	254V
ASE-24AH	50	220-240V	198V	254V
ASE-36AH	50	380-415V	342V	418V
ASE-48AH	50	380-415V	342V	418V
ASE-60AH	50	380-415V	342V	418V

6. Operation Limits

Operation mode	Outdoor temperature(℃)	Room temperature(℃)
Cooling & Heating		
Cooling operation	18~43	17~30
Heating operation	-7~24	17~30

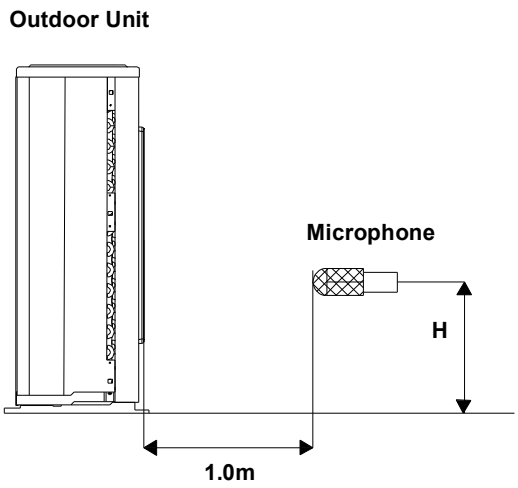
Cooling & Heating





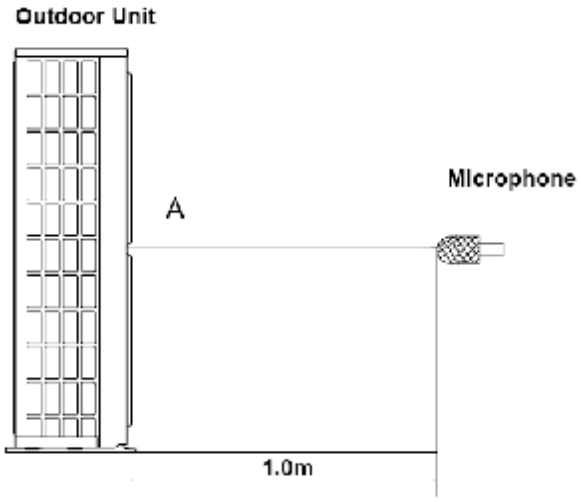
7. Sound Levels

18000Btu/h-48000Btu/h



Note: H= 0.5 × height of outdoor unit

60000Btu/h



Note: The point A is in the middle of the whole outdoor panel.

Model	Noise level dB(A)
ASE-18AH	54
ASE-24AH	55
ASE-36AH (3 phase)	57
ASE-48AH	59
ASE-60AH	59

8. Troubleshooting

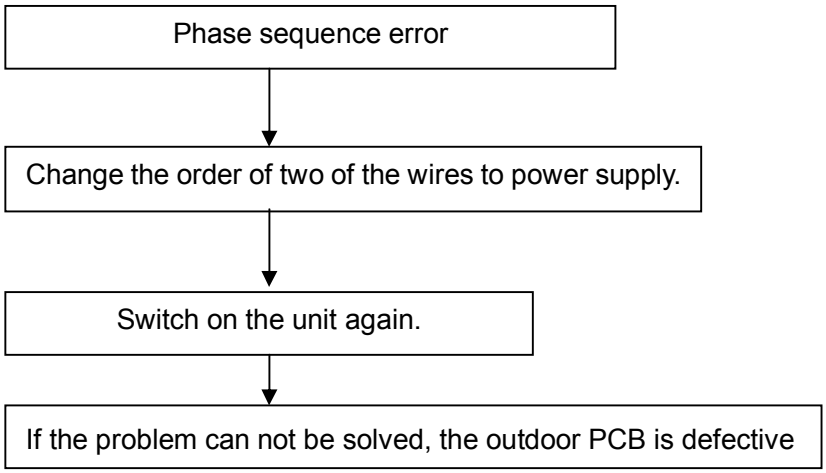
LEDs' for the indication of outdoor trouble

Type	Contents	LED1	LED2	LED3
Trouble	Phase sequence	Flash	Off	Off
Trouble	Lack of phase(A,B)	Flash	Off	Off
Trouble	Lack of phase(C)	Off	Off	Off
Trouble	Protection of Low pressure	Flash	Flash	Off
Trouble	Overload of current	Off	Off	Flash
Trouble	Communication malfunction	Flash	Off	Flash
Trouble	Open-circuit and short-circuit trouble of T3	Off	Flash	Flash
Trouble	Open-circuit and short-circuit trouble of T4	Off	Flash	Off
Trouble	High temperature protection of condenser	Flash	Flash	Flash

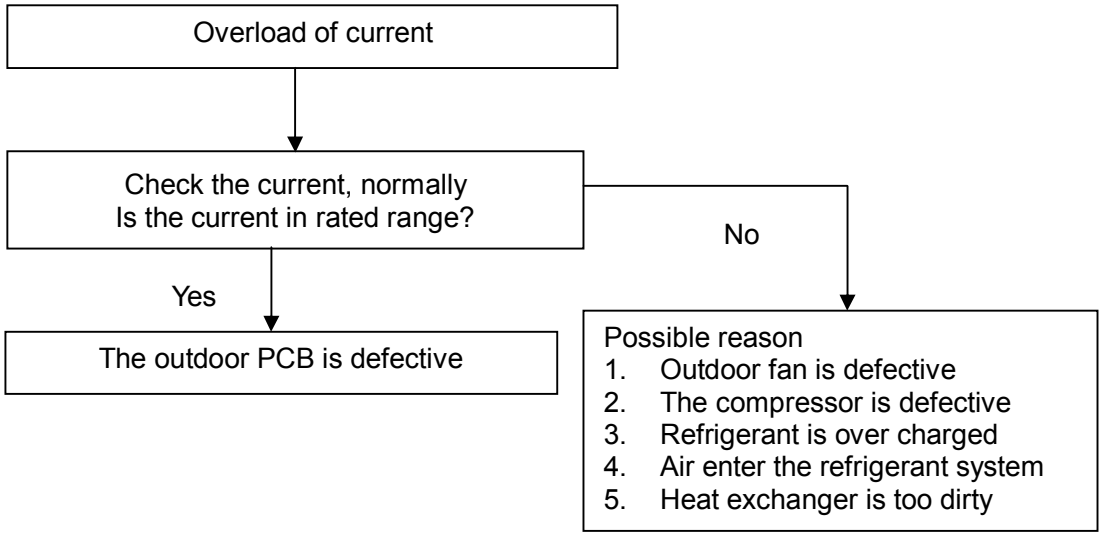
Note:

1. If the LED1-LED3 are flashing slowly,means the system is stand-by.
2. T3: Outdoor condenser temperature sensor
3. T4: Outdoor ambient temperature sensor

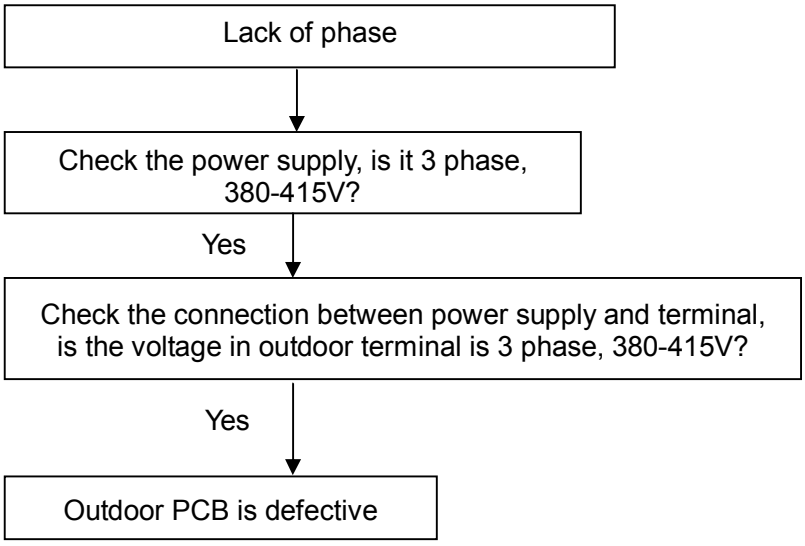
a. Phase sequence error:


Phase sequence error
Change the order of two of the wires to power supply.
Switch on the unit again.
If the problem can not be solved, the outdoor PCB is defective

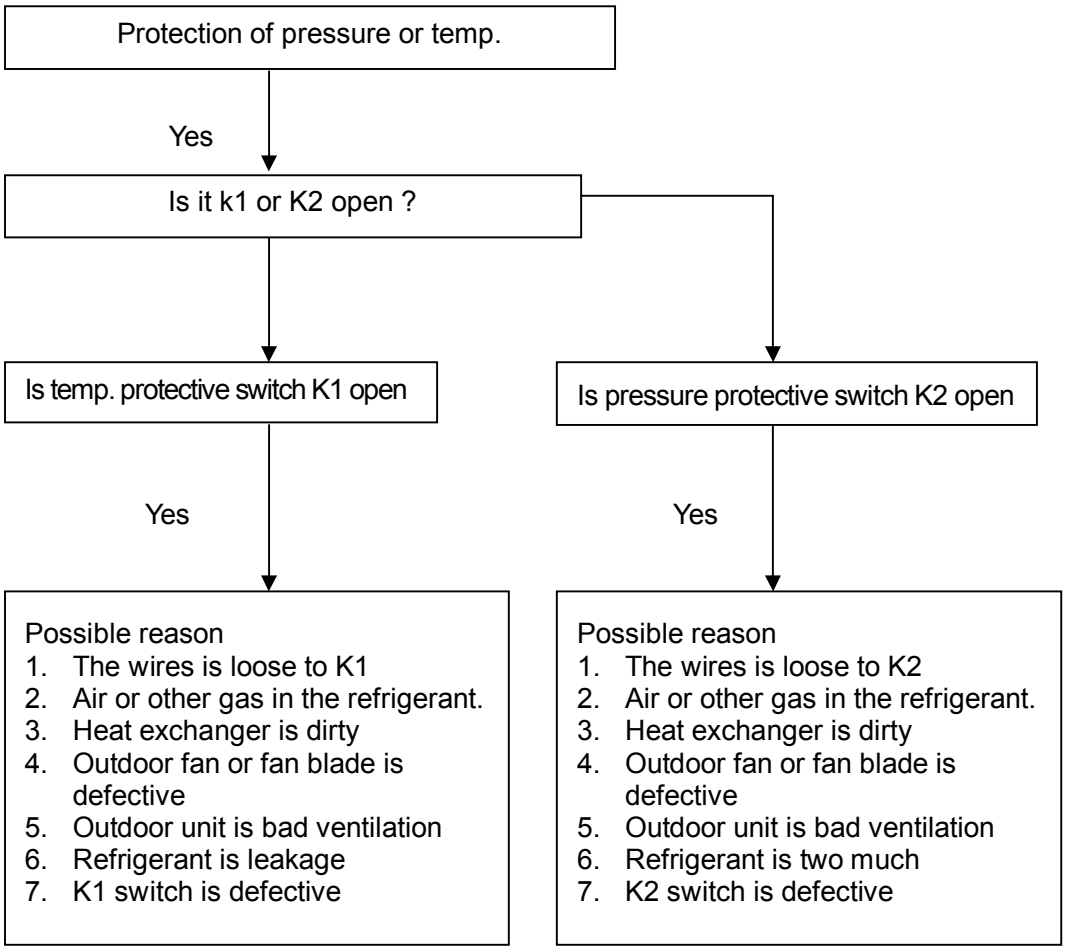
b. Overload of current


Overload of current
Check the current, normally
Is the current in rated range?
No
Yes
The outdoor PCB is defective
Possible reason
1. Outdoor fan is defective
2. The compressor is defective
3. Refrigerant is over charged
4. Air enter the refrigerant system
5. Heat exchanger is too dirty

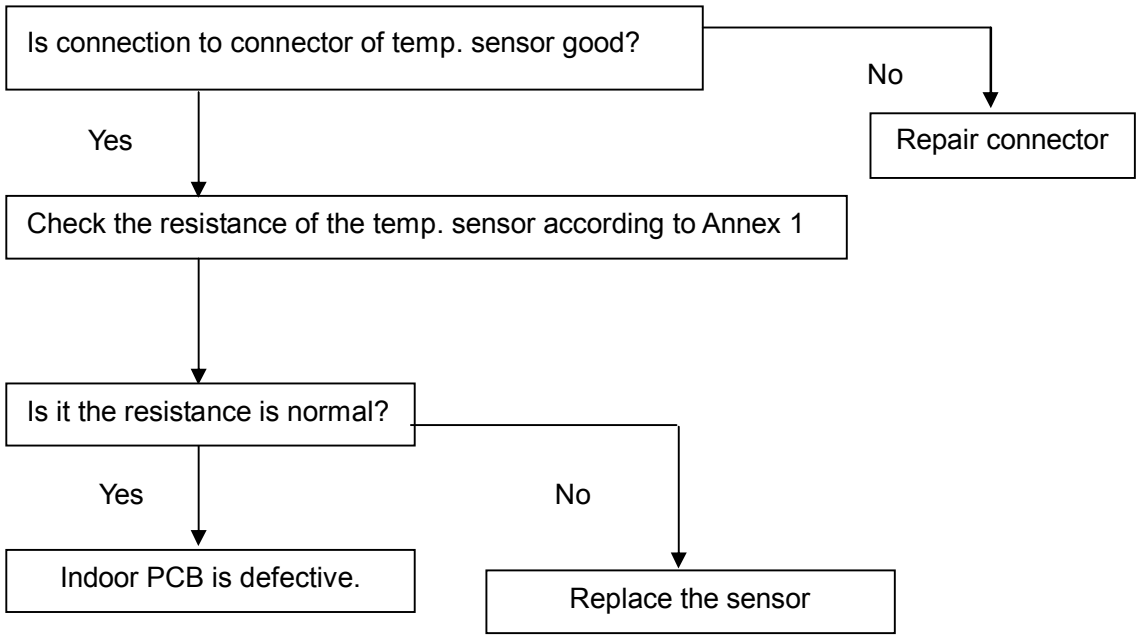
c. Lack of phase


Lack of phase
Check the power supply, is it 3 phase,
380-415V?
Yes
Check the connection between power supply and terminal,
is the voltage in outdoor terminal is 3 phase, 380-415V?
Yes
Outdoor PCB is defective

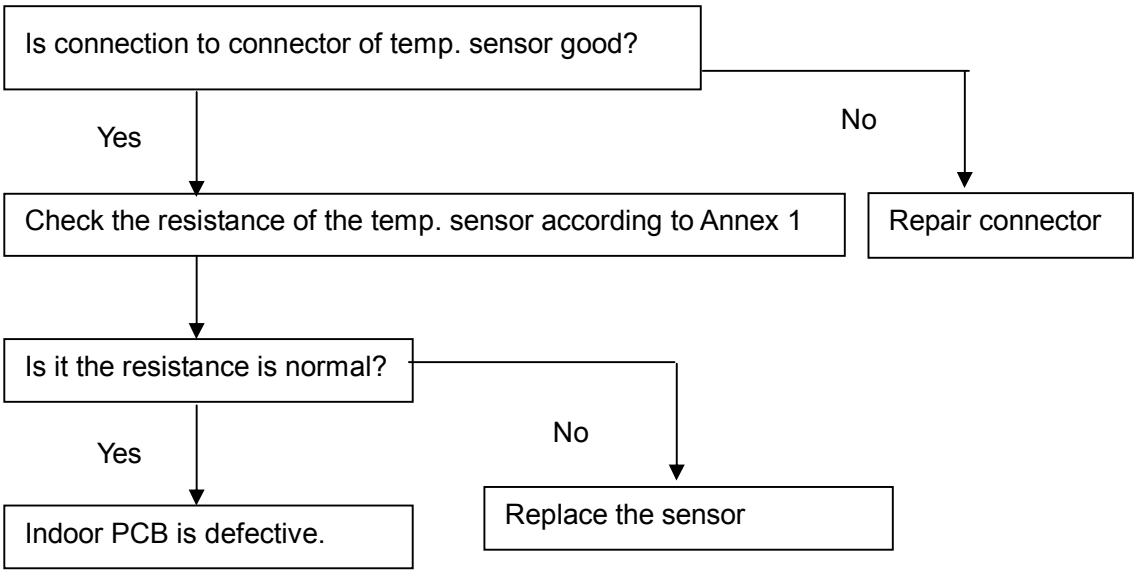
d. Protection of pressure or temp.


Protection of pressure or temp.
Yes
Is it k1 or K2 open ?
Is temp. protective switch K1 open
Is pressure protective switch K2 open
Yes
Yes
Possible reason
1. The wires is loose to K1
2. Air or other gas in the refrigerant.
3. Heat exchanger is dirty
4. Outdoor fan or fan blade is defective
5. Outdoor unit is bad ventilation
6. Refrigerant is leakage
7. K1 switch is defective
Possible reason
1. The wires is loose to K2
2. Air or other gas in the refrigerant.
3. Heat exchanger is dirty
4. Outdoor fan or fan blade is defective
5. Outdoor unit is bad ventilation
6. Refrigerant is two much
7. K2 switch is defective

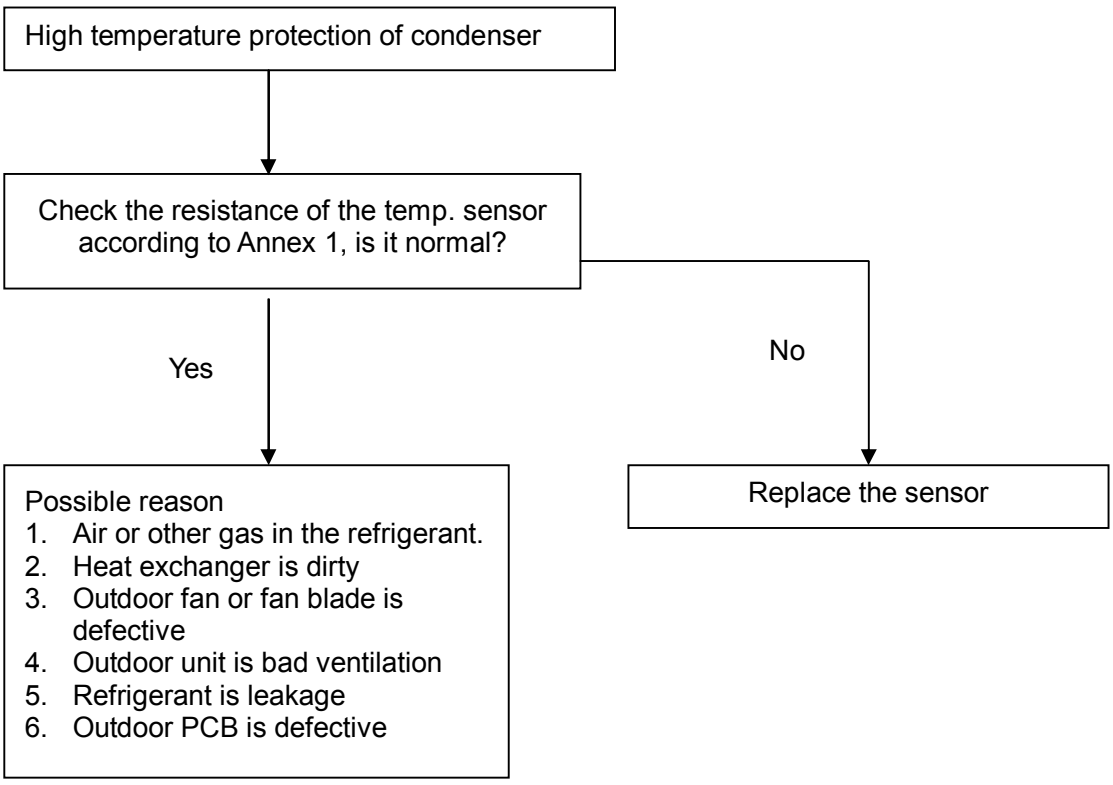
e. Open-circuit and short-circuit trouble of T3



f. Open-circuit and short-circuit trouble of T4



g. High temperature protection of condenser


High temperature protection of condenser
Check the resistance of the temp. sensor according to Annex 1, is it normal?
No
Yes
Replace the sensor
Possible reason
1. Air or other gas in the refrigerant.
2. Heat exchanger is dirty
3. Outdoor fan or fan blade is defective
4. Outdoor unit is bad ventilation
5. Refrigerant is leakage
6. Outdoor PCB is defective

9. Q&A

(1) What is the value of evaporation temperature which is used for calculate cooling capacity?
The evaporation temperature for all of indoor units is around 9-12°C, tested in standard cooling conditions.

Installation

1.Precaution on Installation 132

2.Vacuum Dry and Leakage Checking 133

3.Additional Refrigerant Charge 135

4.Water Drainage 136

5.Insulation Work 139

6.Wiring 140

7.Test Operation 141

1. Precaution on Installation

1). Measure the necessary length of the connecting pipe, and make it by the following way.

a. Connect the indoor unit at first, then the outdoor unit.

Bend the tubing in proper way. Do not harm them.

Specially Notice the pipe length/height/dimension of each capacity.

Maximum pipe length

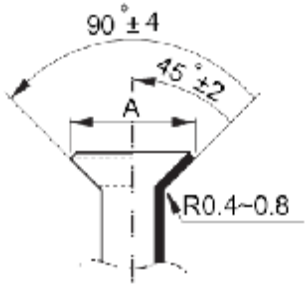
Model	Max. Length	Max. Elevation
12,000Btu/h	15m	8m
18,000Btu/h ~30,000Btu/h	25m	15m
36,000Btu/h	30m	20m
48,000Btu/h~60,000Btu/h	50m	25m

Piping sizes

Model	Liquid(mm)	Gas(mm)
12,000Btu/h~18,000Btu/h	6.4	12.7
24,000Btu/h	9.5	15.9
30,000Btu/h~60,000Btu/h(Cooling Only)	9.5	15.9
30,000Btu/h~60,000Btu/h(Cooling & Heating)	12.7	19

CAUTIONS

- Daub the surfaces of the flare pipe and the joint nuts with frozen oil, and wrench it for 3~4 rounds
- With hands before fasten the flare nuts.
- Be sure to use two wrenches simultaneously when you connect or disconnect the pipes.

Pipe gauge	Tightening torque	Flare dimension A Min (mm) Max		Flare shape
Φ6.4	15～16N.m (153～163 kgf.cm)	8.3	8.7	
Φ9.5	25～26N.m (255～265kgf.cm)	12.0	12.4	
Φ12.7	35～36N.m (357～367kgf.cm)	15.4	15.8	
Φ15.9	45～47N.m (459～480 kgf.cm)	18.6	19.1	
Φ19.1	65～67N.m (663～684kgf.cm)	22.9	23.3	

b. The stop value of the outdoor unit should be closed absolutely (as original state). Every time you connect it, first loosen the nuts at the part of stop value, then connect the flare pipe immediately (in 5 minutes). If the nuts have been loosened for a long time, dusts and other impurities may enter the pipe system and may cause malfunction later. So please expel the air out of the pipe with refrigerant before connection.

c. Expel the air after connecting the refrigerant pipe with the indoor unit and the outdoor unit. Then fasten the nuts at the repair-points.

2) Locate The Pipe

a. Drill a hole in the wall (suitable just for the size of the wall conduit), then set on the fittings such as the wall conduit and its cover.

b. Bind the connecting pipe and the cables together tightly with binding tapes. Do not let air in, which will cause water leakage by condensation.

c. Pass the bound connecting pipe through the wall conduit from outside. Be careful of the pipe allocation to do no damage to the tubing.

3) Connect the pipes.

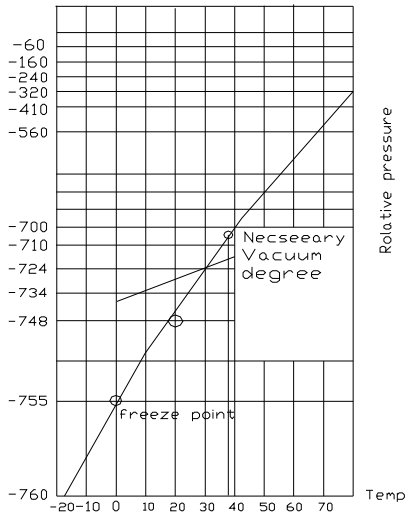
4) Then, open the stem of stop values of the outdoor unit to make the refrigerant pipe connecting the indoor unit with the outdoor unit in fluent flow.

5) Be sure of no leakage by checking it with leak detector or soap water.

6) Cover the joint of the connecting pipe to the indoor unit with the soundproof / insulating sheath (fittings), and bind it well with the tapes to prevent leakage.

2. Vacuum Dry and Leakage Checking

2.1 Vacuum Dry: use vacuum pump to change the moisture (liquid) into steam (gas) in the pipe and discharge it out of the pipe to make the pipe dry. Under one atmospheric pressure, the boiling point of water(steam temperature) is 100℃. Use vacuum pump to make the pressure in the pipe near vacuum state, the boiling point of water falls relatively. When it falls under outdoor temperature, the moisture in the pipe will be vaporized.

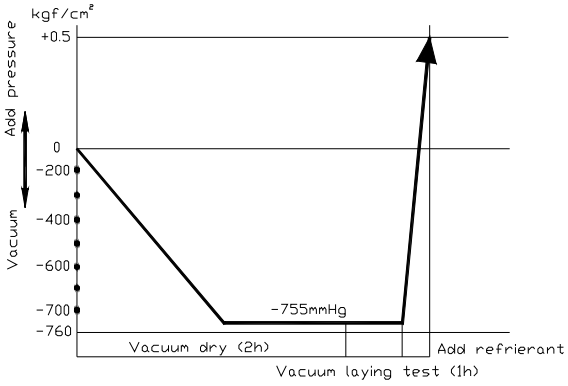


2.2 Vacuum dry procedure

There are two methods of vacuum dry due to different construction environment: common vacuum dry, special vacuum dry.

①. Common vacuum dry procedure

- Vacuum dry (for the first time)---connect the all-purpose detector to the inlet of liquid pipe and gas pipe, and run the vacuum pump more than two hours (the vacuum pump should be below -755mmHg)
- If the pump can't achieve below -755mmHg after pumping 2 hours, moisture or leakage point will still exist in the pipe. At this time, it should be pumped 1 hour more.
- If the pump can't achieve -755mmHg after pumping 3 hours, please check if there are some leakage points.
- Vacuum placement test: place 1 hour when it achieves -755mmHg, pass if the vacuum watch shows no rising. If it rises, it shows there's moisture or leakage point.
- Vacuuming from liquid pipe and gas pipe at the same time.
- Sketch map of common vacuum dry procedure.



②. Special vacuum dry procedure

- This vacuum dry method is used in the following conditions:
- There's moisture when flushing the refrigerant pipe.
- Rainwater may enter into the pipe.
- Vacuum dry for the first time ····· 2h pumping

③. Vacuum destroy for the second time ····· Fill nitrogen to 0.5Kgf/cm^2

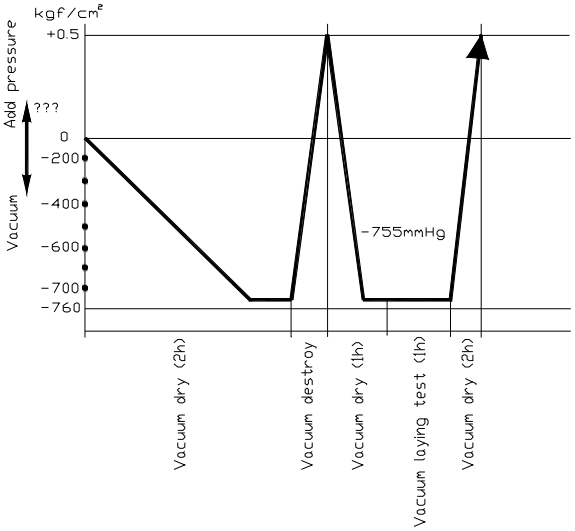
Because nitrogen is for drying gas, it has vacuum drying effect during vacuum destroy. But if the moisture is too much, this method can't dry thoroughly. So, please pay more attention to prevent water entering and forming condensation water.

④. Vacuum dry for the second time·····1h pumping

Determinant: Pass if achieving below -755mmHg. If -755mmHg can't be achieved in 2h, repeat procedure ③ and ④.

⑤. Vacuum placing test ····· 1h

⑥. Sketch map of special vacuum dry procedure



3. Additional Refrigerant Charge

Caution

● Refrigerant cannot be charged until field wiring has been completed.

● Refrigerant may only be charged after performing the leak test and the vacuum pumping.

● When charging a system, care shall be taken that its maximum permissible charge is never exceeded, in view of the danger of liquid hammer.

● Charging with an unsuitable substance may cause explosions and accidents, so always ensure that the appropriate refrigerant is charged.

● Refrigerant containers shall be opened slowly.

● Always use protective gloves and protect your eyes when charging refrigerant.

The outdoor unit is factory charged with refrigerant. Calculate the added refrigerant according to the diameter and the length of the liquid side pipe of the outdoor unit/indoor unit

R(g) D(mm) / L(m)	φ6.4	Φ9.5	Φ12.7
Less than 5m (One-way)	—	—	—
Added Refrigerant When Over 5m(One-way)	11g/m×(L-5)	30g/m×(L-5)	60g/m×(L-5)

Remark:

R (g): Additional refrigerant to be charged

L (m): The length of the refrigerant pipe (one-way)

D (mm): Liquid side piping diameter

4. Water Drainage

4.1 Gradient and Supporting

4.1.1 Keep the drainpipe sloping downwards at a gradient of at least 1/100. Keep the drainpipe as short as possible and eliminate the air bubble.

4.1.2 The horizontal drainpipe should be short. When the pipe is too long, a prop stand must be installed to keep the gradient of 1/100 and prevent bending. Refer to the following table for the specification of the prop stand.

	Diameter	Distance between the prop stands
Hard PVC pipe	25~40mm	1.5~2m

4.1.3. Precautions

① The diameter of drainpipe should meet the drainage requirement at least.

② The drainpipe should be heat-insulated to prevent atomization.

③ Drainpipe should be installed before installing indoor unit. After powering on, there is some water in water-receiver plate. Please check if the drain pump can operate correctly.

④ All connection should be firm.

⑤ Wipe color on PVC pipe to note connection.

⑥ Climbing, horizontal and bending conditions are prohibited.

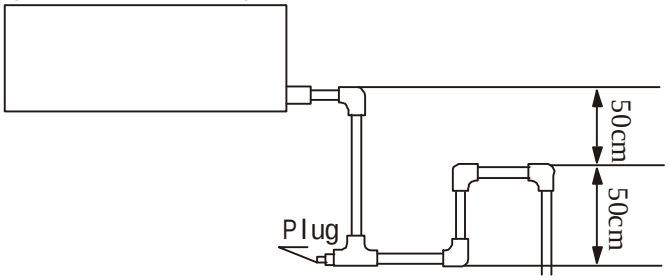
⑦ The dimension of drainpipe can't less than the connecting dimension of indoor drainpipe.

⑧ Heat-insulation should be done well to prevent condensation.

⑨ Indoor units with different drainage type can't share one convergent drainpipe.

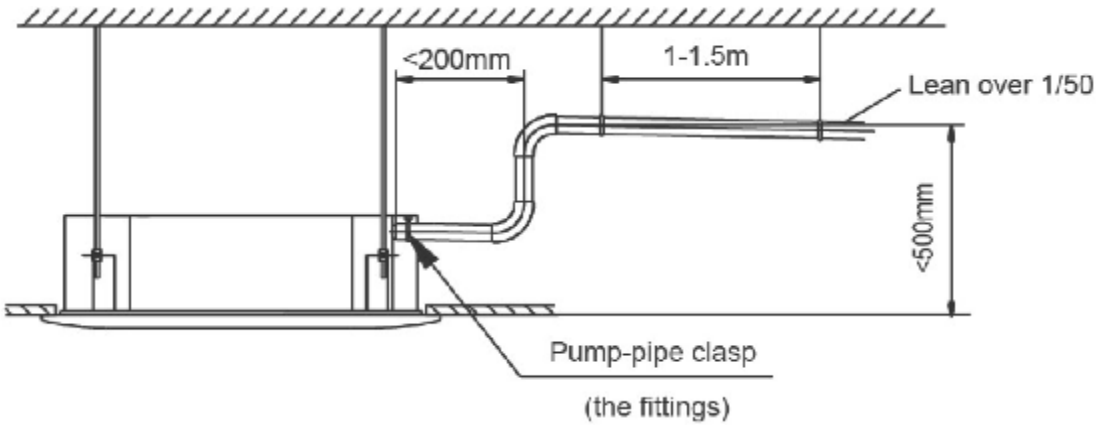
4.2 Drainpipe Trap

4.2.1. If the pressure at the connection of the drainpipe is negative, it needs to design drainpipe trap.
4.2.2. Every indoor unit needs one drainpipe trap.
4.2.3. A plug should be designed to do cleaning.

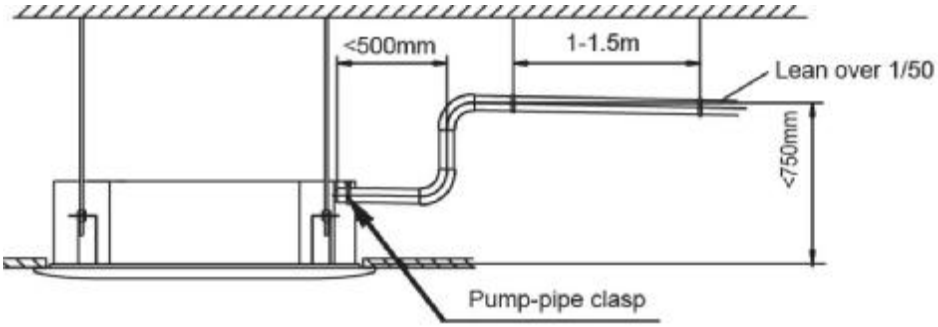


4.3 Upwards drainage (drain pump)

For Four-way cassette(compact)

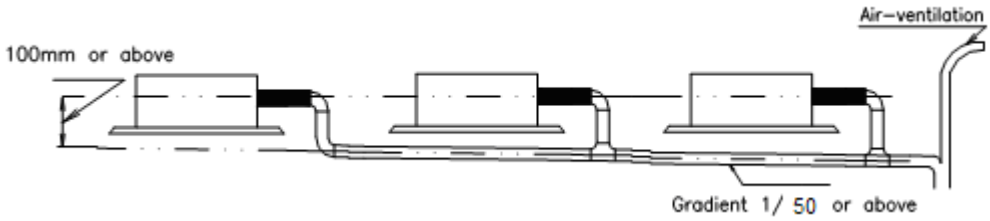


For Four-way cassette



4.4 Convergent drainage

4.4.1. The number of indoor units should be as small as possible to prevent the traverse main pipe overlong.
4.4.2. Indoor unit with drain pump and indoor unit without drain pump should be in different drainage system.



4.4.3. Selecting the diameter

Number of connecting indoor units→Calculate drainage volume→Select the diameter
Calculate allowed volume =Total cooling capacity of indoor units(HP)×2 (l/ hr)

	Allowed volume(lean 1/50) (l/ hr)	I.D. (mm)	Thick
Hard PVC	∽≤14	¢25	3.0
Hard PVC	14＜∽≤88	¢30	3.5
Hard PVC	88＜∽≤334	¢40	4.0
Hard PVC	175＜∽≤334	¢50	4.5
Hard PVC	334＜∽	¢80	6.0

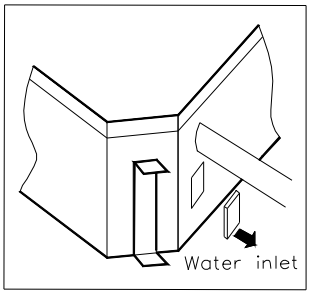
4.5 Drainage test

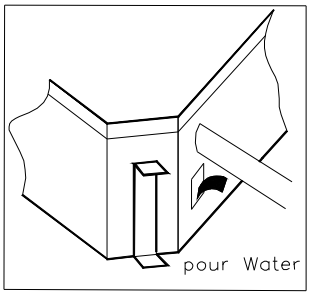
4.5.1Drainage without drain pump

After finishing drainpipe installation, pour some water into the water receiver plate to check if the water flows smoothly.

4.5.2 Drainage with drain pump

① Poke the Water Level Switch, remove the cover, use water pipe to pour 2000ml water into the water receipt plate through the water inlet.





② Turn on the power to Cooling operation. Check the pump's operation and switch on the Water Level Switch. Check the pump's sound and look into the transparent hard pipe in the outlet at the same time to check if the water can discharge normally.

③ Stop the air conditioner running, turn off the power, and put back the cover.

- Stop the air conditioner. After 3 minutes, check if it has abnormity. If the collocation of drainpipes is illogical, the water will flow back overfull, which will cause the alarm lamp flashes, even overflow from the water receipt plate.
- Keep on pouring water until it gives an alarm signal for high water level, check if the pump drains water at once. If the water level can't fall below the alarmed water level after 3 minutes, the air conditioner will stop. Turn off the power and drain the remained water, and then turn on the air conditioner.

Note: the drain stuff in the main water receipt plate is for maintenance. Stuff up the drain stuff to prevent water leakage.

5. Insulation Work

5.1 Insulation material and thickness

5.1.1. Insulation material

Insulation material should adopt the material which is able to endure the pipe's temperature: no less than 70℃ in the high-pressure side, no less than 120℃ in the low-pressure side(For the cooling type machine, no requirements at the low-pressure side.)

u Example: Heat pump type----Heat-resistant Polyethylene foam (withstand above 120℃)
Cooling only type----Polyethylene foam (withstand above 100℃)

5.1.2. Thickness choice for insulation material

Insulation material thickness is as follows:

	Pipe diameter (mm)	Adiabatic material thickness
Refrigerant pipe	Φ6.4—Φ25.4	10mm
	Φ28.6—Φ38.1	15mm
Drainage pipe	Inner diameterΦ20—Φ32	6mm

5.2 Refrigerant pipe insulation

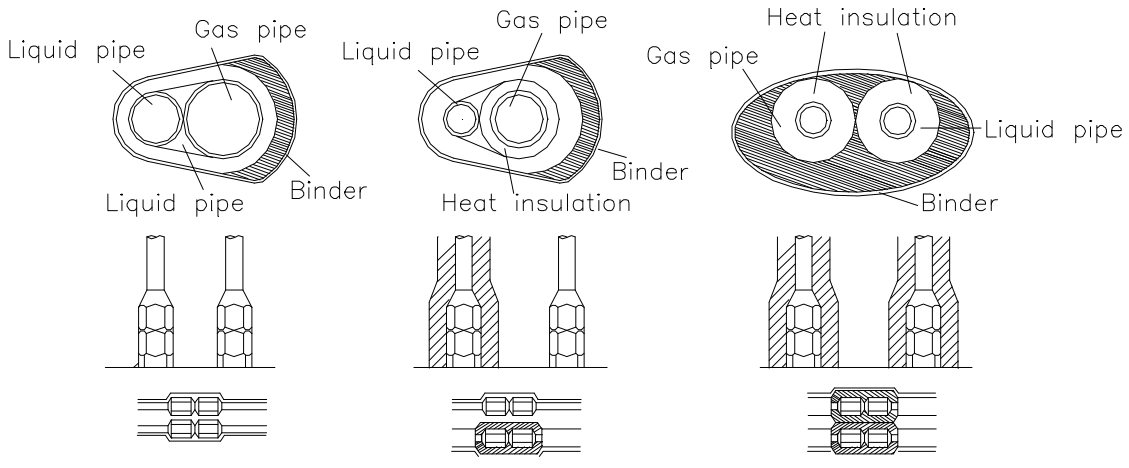
5.2.1. Work Procedure

① Before laying the pipes, the non-jointing parts and non-connection parts should be heat insulated.

② When the gas proof test is eligible, the jointing area, expanding area and the flange area should be heat insulated

5.2.2. Insulation for non-jointing parts and non-connection parts

wrong	right	
Gas pipe and liquid pipe should not be put together to insulate	Insulate the gas pipe (cooling only)	Insulate the gas pipe and liquid pipe

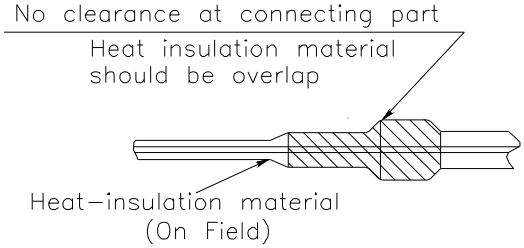


For construction convenience, before laying pipes, use insulation material to insulate the pipes to be deal with, at the same time, at two ends of the pipe, remain some length not to be insulated, in order to be welded and check the leakage after laying the pipes.

5.2.3. Insulate for the jointing area, expanding area and the flange area

① Insulate for the jointing area, expanding area and the flange area should be done after checking leakage of the pipes

② Make sure there's no clearance in the joining part of the accessorial insulation material and local preparative insulation material.



5.3 Drainage pipe insulation

The connection part should be insulated, or else water will be condensing at the non-insulation part.

5.4 Note

5.4.1 The jointing area, expanding area and the flange area should be heat insulated after passing the pressure test

5.4.2 The gas and liquid pipe should be heat insulated individually, the connecting part should be heat insulated individually.

5.4.3 Use the attached heat-insulation material to insulate the pipe connections (pipes' tie-in ,expand nut) of the indoor unit

6. Wiring

Please refer to the Wiring Diagram.

7. Test Operation

(1) The test operation must be carried out after the entire installation has been completed.
(2) Please confirm the following points before the test operation.

- The indoor unit and outdoor unit are installed properly.
- Tubing and wiring are correctly completed.
- The refrigerant pipe system is leakage-checked.
- The drainage is unimpeded.
- The ground wiring is connected correctly.
- The length of the tubing and the added stow capacity of the refrigerant have been recorded.
- The power voltage fits the rated voltage of the air conditioner.
- There is no obstacle at the outlet and inlet of the outdoor and indoor units.
- The gas-side and liquid-side stop values are both opened.
- The air conditioner is pre-heated by turning on the power.

(3) According to the user's requirement, install the remote controller when the remote controller's signal can reach the indoor unit smoothly.
(4) Test operation
Set the air conditioner under the mode of "COOLING" with the remote controller, and check the following points.
Indoor unit

- Whether the switch on the remote controller works well.
- Whether the buttons on the remote controller works well.
- Whether the air flow louver moves normally.
- Whether the room temperature is adjusted well.
- Whether the indicator lights normally.
- Whether the temporary buttons works well.
- Whether the drainage is normal.
- Whether there is vibration or abnormal noise during operation.

Outdoor unit

- Whether there is vibration or abnormal noise during operation.
- Whether the generated wind, noise, or condensed of by the air conditioner have influenced your neighborhood.
- Whether any of the refrigerant is leaked.

PARTS GUIDE

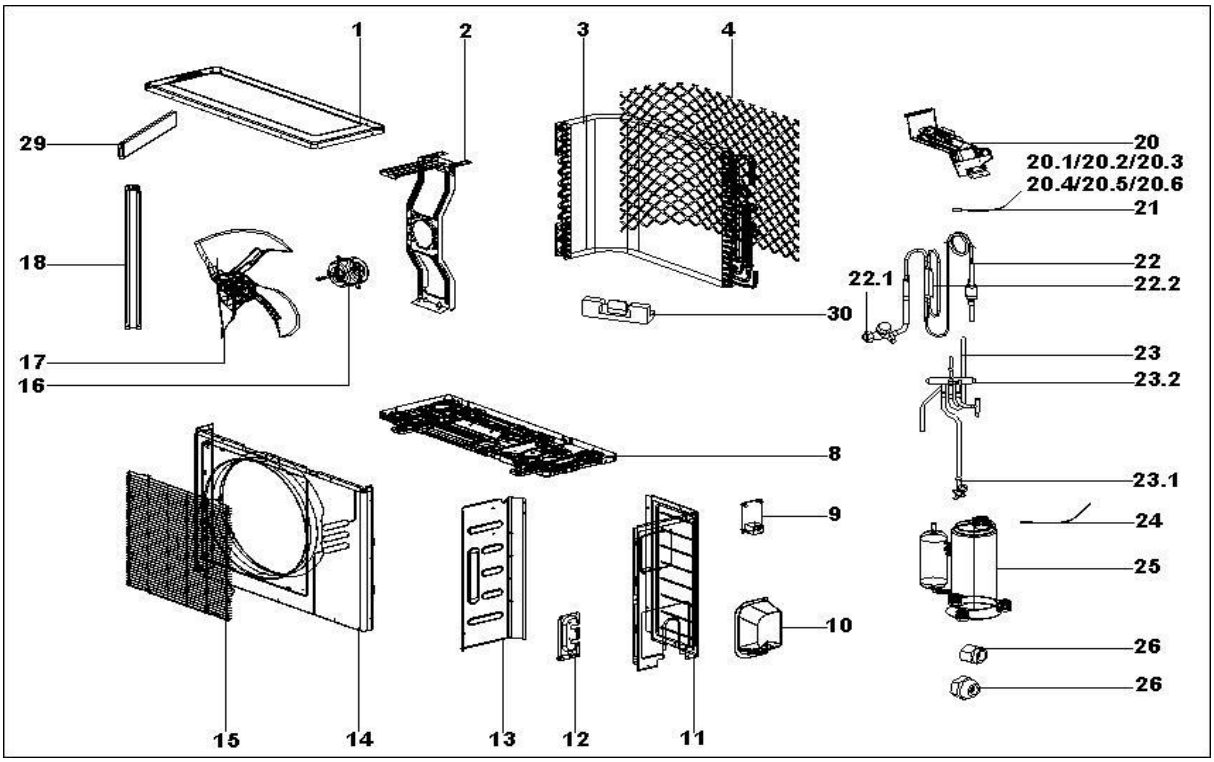
CONDENSING UNIT

ASE-18AH, ASE-24AH, ASE-36AH, ASE-48AH, ASE-60AH

sinclair
AIR CONDITIONING

Exploded view

model: ASE-18AH



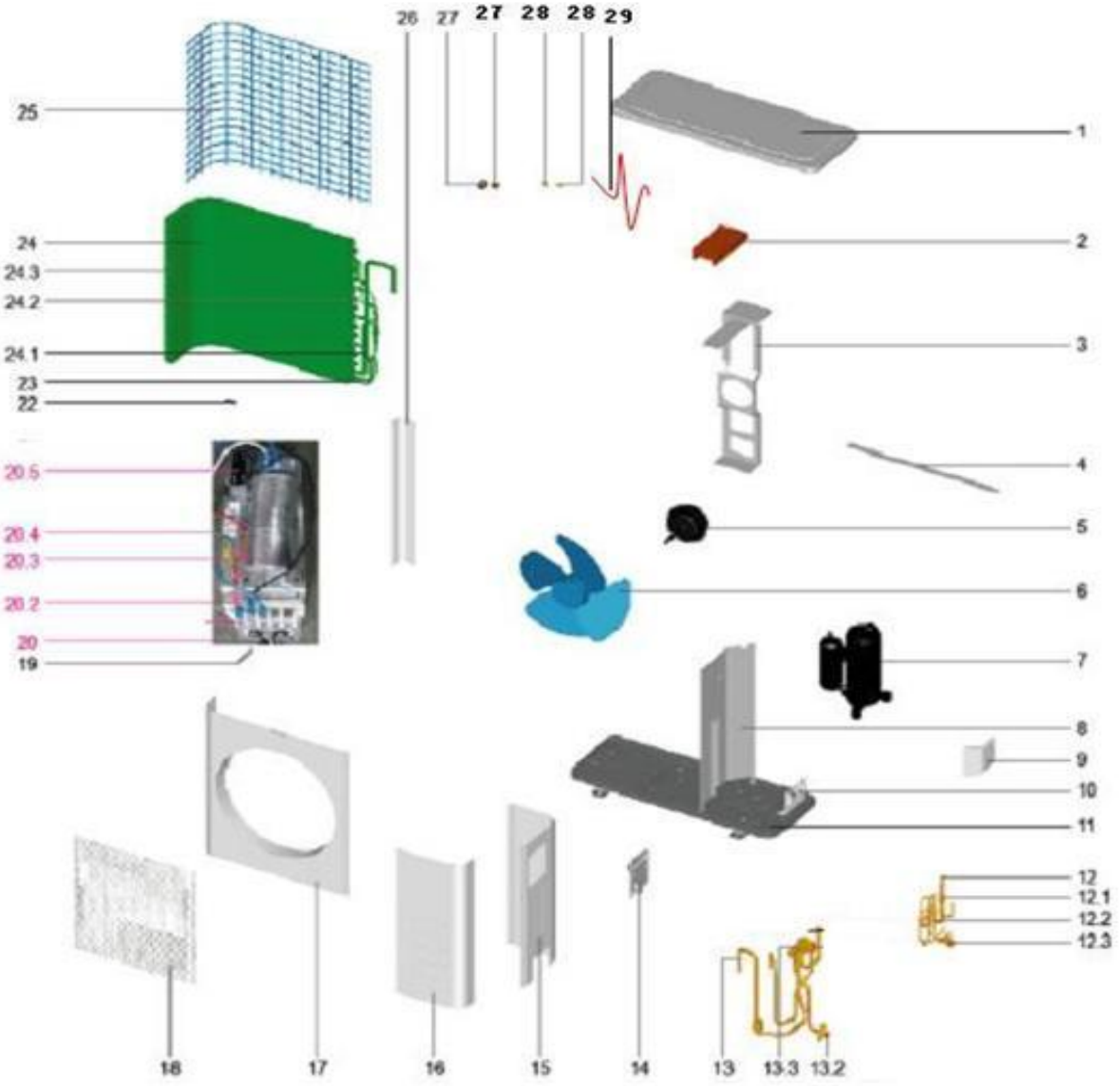
Spare part list

No	Description	Part Code	Note	Qty	Price Code
MODEL: ASE-18AH					
1	Top cover assembly	201237400324		1	
2	Supporter assembly of fan motor	201237890017		1	
3	Condenser assembly	201537990033		1	
4	Rear net	2011374G0003		1	
8	Chassis assembly	201237890085		1	
9	Big handle	201148100010		1	
10	Water collector	201137400000		1	
11	Right clapboard assembly	201248100239		1	
12	Valve plate	201237200044		1	
13	Partition board assembly	201237890019		1	
14	Front panel assembly	201237890067		1	
15	Air outlet grille	201237890069		1	
16	Asynchronous motor	202400410505		1	
17	Axial flow fan	201100300514		1	
18	Left supporter bar	201237400323		1	
20	Electronic control box assembly	203337890230		1	
20.1	Fan motor capacitor	202401100353		1	
20.2	Compressor capacitor	202401090057		1	
20.3	Wire joint	202301450130		1	
20.4	Wire joint,2p	202301450043		1	
20.5	Installation plate of electric parts	201275290102		1	
20.6	Capacitor clip	201200100002		1	
21	Pipe temperature sensor assembly	202440500004		1	
22	Liquid valve assembly	201637890680		1	
22.1	Liquid valve	201600740523		1	
22.2	One way valve	201600800065		1	
23	4-way valve assembly	201637890605		1	
23.1	Gas valve	201600720195		1	
23.2	4-way valve	201600690011		1	
24	Compressor wire assembly	202402220011		1	
25	Compressor	201400620240		1	
26	Nut	201600330003			
26	Nut	201600330001			
29	Small handle	201157090002		1	
30	Clamp of front net	201135110801		8	

The data are subject to change without notice.

Exploded view

model:ASE-24AH



Spare part list

No	Description	Part Code	Note	Qty	Price Code
MODEL: ASE-24AH					
1	Top cover assembly	201248100266		1	
2	Fan motor fixing foam	202245500001		1	
3	Supporter assembly of fan motor	2012481G0038		1	
4	Rear net frame	201248100076		1	
5	Asynchronous motor	202400430109		1	
6	Axial flow fan	201145500002		1	
7	Compressor	201400620150		1	
8	Partition board assembly	201238090056		1	
9	Water collector	201137390007		1	
10	Valve plate	201237300021		1	
11	Chassis assembly	201248100235		1	
12	Liquid valve assembly	201675390577		1	
12.1	Filter	201637990265		1	
12.2	One way valve	201600800014		1	
12.3	Liquid valve	201600740299		1	
13	4-way valve assembly	201675390574		1	
13.2	Gas valve	201600720296		1	
13.3	4-way valve	201600690011		1	
14	Big handle assembly	201148100010		1	
15	Rear right clapboard assembly	201237890063		1	
16	Front right clapboard assembly	201248100234		1	
17	Front panel	201248100236		1	
18	Air outlet grille	201237890022		1	
19	Small handle	201157090002		1	
20	Electronic control box assembly	203375390286		1	
20.2	Wire joint	202301450122		1	
20.2	Wire joint	202301450127		1	
20.3	Compressor capacitor	202401090057		1	
20.4	Installation plate of electric parts	201237900010		1	
20.5	Fan motor capacitor	202401100505		1	
22	Clamp of front net	201135110801		8	
23	Pipe temperature sensor assembly	202440500004		1	
24	Condenser assembly	201537990000		1	
24.1	Fluted pipe assembly	201635490563		1	
24.2	Input pipe assembly	201637990115		1	
24.3	Condenser assembly	201535490089		1	
25	Rear net	2011481G0001		1	
26	Left supporter	201248100228		1	
27	Copper nut	201600320001		1	
27	Copper nut	201600320003		1	
28	Sphere pad	201119900804		1	
28	Sphere pad	201119900802		1	
29	Compressor wire assembly	202402220094		1	

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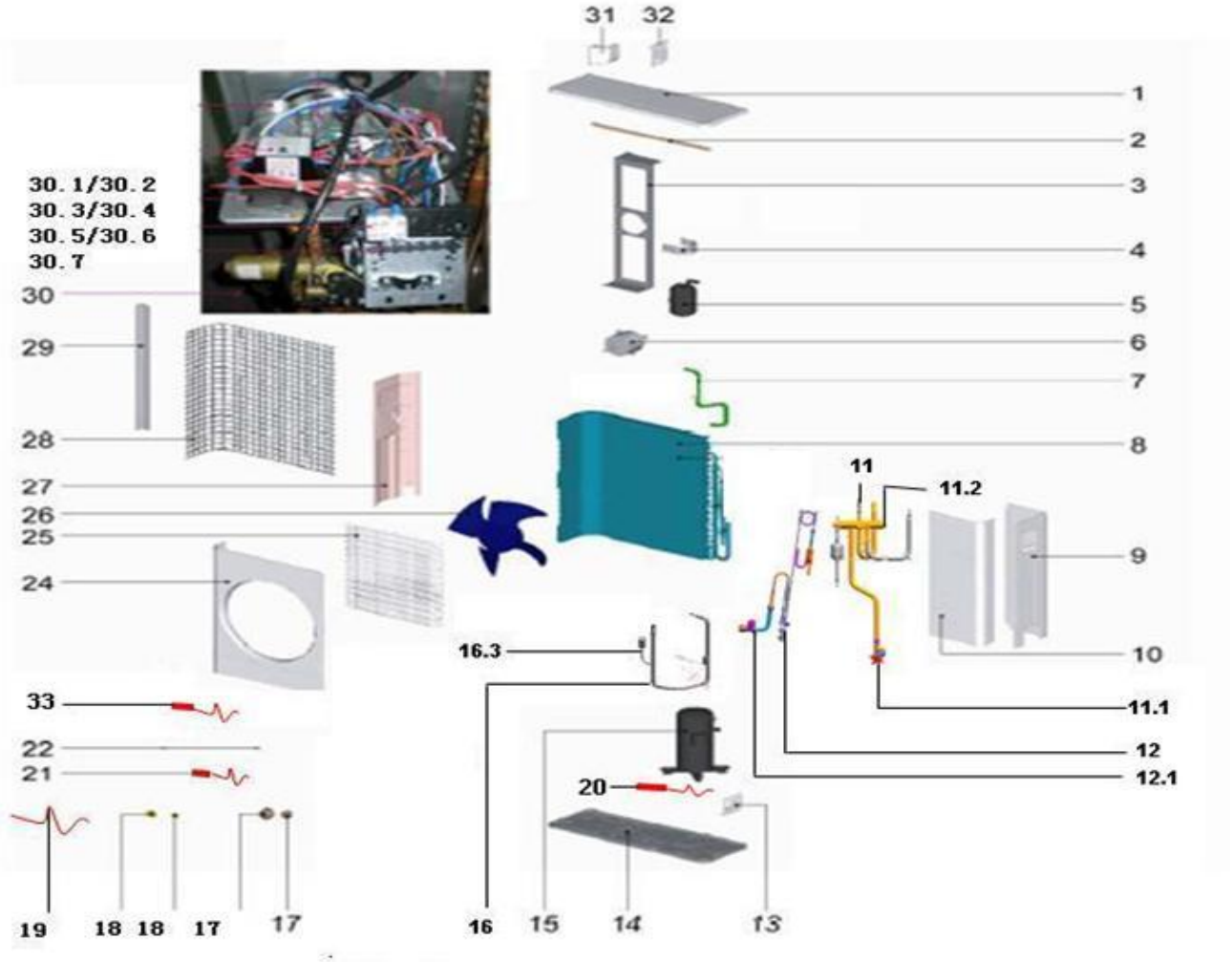
Exploded view
model:ASE-36AH



Spare part list

No	Description	Part Code	Note	Qty	Price Code
MODEL: ASE-36AH					
1	Top cover assembly	201248700174		1	
2	Rear supporter	2012487G0011		1	
3	Supporter assembly of fan motor	201275590200		1	
4	Fix clamp of segregator	201245000901		1	
5	Accumulator cylinder	201601000193		1	
6	Asynchronous motor	202400400582		1	
7	Suction pipe	201648700055		1	
8	Condenser assembly	201575590104		1	
9	Rear right clapboard assembly	201248700171		1	
10	Front right clapboard assembly	201248700056		1	
11	4-way valve assembly	201675590621		1	
11.1	Gas valve	201600720684		1	
11.2	4-way valve	201600600124		1	
12	Liquid valve assembly	201675591069		1	
12.1	Liquid valve	201600740704		1	
13	Valve plate	201248790011		1	
14	Chassis	201248700168		1	
15	Compressor	201400710580		1	
16	Discharge pipe assembly	201675591023		1	
16.3	Pressure switch	202301820020		1	
17	Copper nut	201600320004		1	
17	Copper nut	201600320002		1	
18	Sphere pad	201119900803		1	
18	Sphere pad	201119900801		1	
19	Compressor wire assembly	202447590004		1	
20	Crankcase electric heater	202447090021		1	
21	Pipe temperature sensor assembly	202301300111		1	
22	Discharge temperature sensor	202301610024		1	
24	Front panel	201248700072		1	
25	Front net assembly	201248700055		1	
26	Axial flow fan	201100300145		1	
27	Partition board assembly	201248700070		1	
28	Rear net	2011487G0001		1	
29	Left supporter	201248700172		1	
30	Electronic control box assembly	203375590218		1	
30.1	Wire joint	202301450117		3	
30.1	Wire joint	202301450130		1	
30.1	Wire joint	202301450039		1	
30.2	Installation plate of electric parts	201275590077		1	
30.3	AC contactor	202300850046		1	
30.4	Terminal board	201247010643		1	
30.5	Main control board assembly	201375590150		1	
30.6	Compressor capacitor	202401000006		1	
30.7	Transformer	202300900083		1	
31	Water collector	201148790000		1	
32	Big handle assembly	201157390007		1	
33	Indoor temperature sensor assembly	202301300196		1	

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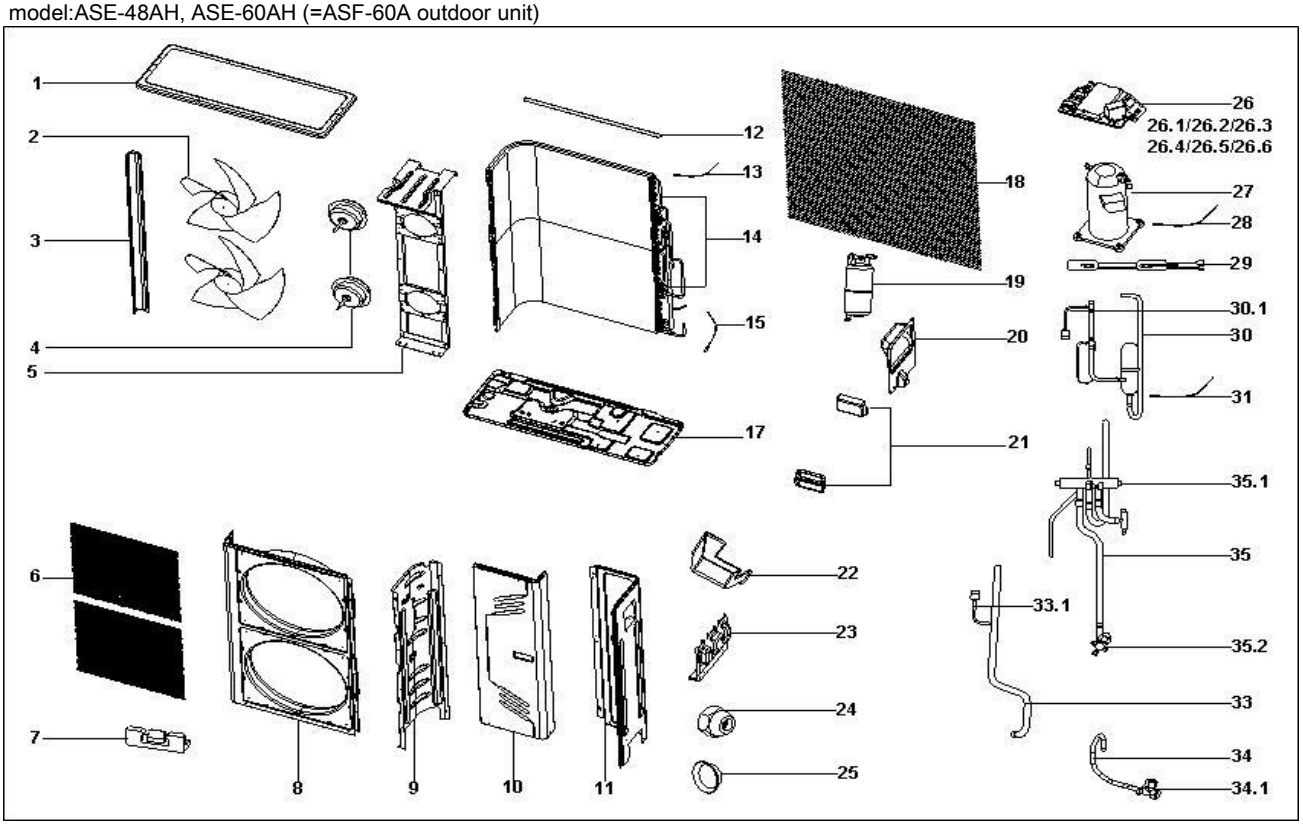
Exploded view

model:ASE-48AH, ASE-60AH (=ASF-60A outdoor unit)



Spare part list

No	Description	Part Code	Note	Qty	Price Code
MODEL: ASE-48AH					
1	Top cover assembly	201275600087		1	
2	Axial flow fan	201100300102		2	
3	Rear-left supporting board	201275600107		1	
4	Asynchronous motor YDK65-6(B)	202400401180		1	
4	Asynchronous motor YDK65-6F(B)	202400401181		1	
5	Supporter assembly of fan motor	201275600101		1	
6	Front net assembly	201275890056		2	
7	Clamp of front net	201135110801		8	
8	Front panel	201275600105		1	
9	Partition board assembly	201275890038		1	
10	Front-right panel assembly	201275890054		1	
11	Rear-right panel	201275600103		1	
12	Rear supporter	201275600086		1	
13	Indoor temperature sensor assembly	202301300196		1	
14	Condenser assembly	201575790067		1	
14	Condenser assembly	201575790069		1	
15	Pipe temperature sensor assembly	202301300111		1	
17	Chassis	201275600100		1	
18	Rear net	201175600083		1	
19	Separator	201601100059		1	
20	Big handle assembly	201157390007		1	
21	Handle	201148700009		2	
22	Water collector	201148790000		1	
23	Valve plate	201248790011		1	
24	Copper nut	201600320004		1	
24	Copper nut	201600320002		1	
25	Sphere pad	201119900801		1	
25	Sphere pad	201119900803		1	
26	Electronic control box assembly	203375790082		1	
26.1	Installation plate of electric parts	201275600111		1	
26.2	Main control board assembly	201375490007		1	
26.3	AC contactor	202300850045		1	
26.4	Transformer	202300900153		1	
26.5	Wire joint	202301450003		1	
26.5	Wire joint	202301450039		1	
26.5	Wire joint	202301450117		3	
26.6	Fan motor capacitor	202401100354		2	
27	Compressor	201400710570		1	
28	Compressor wire assembly	202445400405		1	
29	Crankcase electric heater	202403100238		1	
30	Discharge pipe assembly	2016757A0102		1	
30.1	Pressure switch	202301820042		1	
31	Discharge temperature sensor	202301610500		1	
33	Suction pipe assembly	2016757A0105		1	
33.1	Pressure switch	202301820021		1	
34	Liquid valve assembly	201675790499		1	
34.1	High pressure valve	201600740519		1	
35	Gas valve assembly	201675790495		1	
35.1	4-way valve	201600600124		1	
35.2	Gas valve	201600720684		1	
37	Condenser connection pipe	201675790492		1	

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No	Description	Part Code	Note	Qty	Price Code
MODEL: ASE-60AH (=ASF-60A outdoor)					
1	Top cover assembly	201275600087		1	
2	Axial flow fan	201100300102		2	
3	Rear-left supporting board	201275600107		1	
4	Asynchronous motor YDK65-6(B)	202400401180		1	
4	Asynchronous motor YDK65-6F(B)	202400401181		1	
5	Supporter assembly of fan motor	201275600101		1	
6	Front net assembly	201275890056		2	
7	Clamp of front net	201135110801		8	
8	Front panel	201275600105		1	
9	Partition board assembly	201275890038		1	
10	Front-right panel assembly	201275890054		1	
11	Rear-right panel	201275600089		1	
12	Rear supporter	201275600086		1	
13	Indoor temperature sensor assembly	202301300196		1	
14	Condenser assembly	201548890010		1	
15	Pipe temperature sensor assembly	202301300111		1	
17	Chassis	201275600100		1	
18	Rear net	201175600083		1	
19	Separator	201601100059		1	
20	Big handle assembly	201157390007		1	
21	Handle	201148700009		2	
22	Water collector	201148790000		1	
23	Valve plate	201248790011		1	
24	Copper nut	201600320004		1	
24	Copper nut	201600320002		1	
25	Sphere pad	201119900801		1	
25	Sphere pad	201119900803		1	
26	Electronic control box assembly	203375890114		1	
26.1	Installation plate of electric parts	201275600111		1	
26.2	Main control board assembly	201375890088		1	
26.3	AC contactor	202300850045		1	
26.4	Transformer	202300900153		1	
26.5	Wire joint	202301450003		1	
26.5	Wire joint	202301450039		1	
26.5	Wire joint	202301450117		3	
26.6	Fan motor capacitor	202401100354		2	
27	Compressor	201400710560		1	
28	Compressor wire assembly	202445400405		1	
29	Crankcase electric heater	202447090021		1	
30	Discharge pipe assembly	201675890375		1	
30.1	Pressure switch	2023018A0011		1	
31	Discharge temperature sensor	202301610500		1	
33	Suction pipe assembly	201675890378		1	
33.1	Pressure switch	202301810104		1	
34	Liquid valve assembly	201675890373		1	
34.1	Liquid valve	201600740599		1	
35	Gas valve assembly	201675890721		1	
35.1	4-way valve	201600600124		1	
35.2	Gas valve	201600720684		1	

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